

**TOPIC: GROSS MORPHOLOGICAL AND PATHOLOGICAL
CHANGES IN PLACENTA OF DIABETIC PATIENTS AND ITS
ASSOCIATION WITH FETAL OUTCOME**

ABSTRACT

INTRODUCTION:

Placenta is a latin word which literally means a flat plate or cake. Placenta is a very complex organ which has a very short life- span of 9 months and serves as a channel between the foetus and the mother for the selective forward transport of gases, nutrients and reverse transport of metabolic waste products. Placenta separate the fetal and maternal circulation via endothelium and syncytiotrophoblast respectively.

The development of placental villous vessels continues throughout the pregnancy and comprises of two stages, vasculogenesis and angiogenesis. The stage of vasculogenesis occurs mainly during the period of first and second trimester, in which the mesenchymal cells of the villous core differentiate into the cords of vascular cells and by the process of dehiscence, it forms the vascular lamina. The cells required for the elongation and widening of vessels and the perivascular cells – pericytes are also derived from the mesenchymal cells. In stem villi, arteries and veins are differentiated from the vessels. The surrounding supporting structures of the walls of the vessels like smooth muscle cells, myofibroblasts and fibroblasts are also recruited from the villous stroma. On the other hand, the stage of angiogenesis takes place during

the third trimester. In this process, the already existing stem villous vessels sprouts and give rise to new capillaries, and thus by this way vascularizing the emerging mature intermediate and terminal villi.

Metabolic disease associated with pregnancy such as diabetes mellitus and hypertension can affect the components of placenta for e.g. connective tissue component in chorionic villi and the basement membrane lining the chorionic villi.

The Centres for Disease Control and Prevention (CDC) has shown that the crude incidence of the cases diagnosed with diabetes mellitus has increased, from 3.3 per 1000 to 7.4 per 1000, i.e. 124%, from the year 1980 to 2005 and hence, diabetes mellitus is now considered to be one of the major health problem in our society. Various studies suggested that the increased prevalence of diabetes mellitus (DM) amongst the women of childbearing age is due to increase in sedentary lifestyles, changes in dietary habits and the virtual epidemic of childhood and adolescent obesity.

GDM or Gestational Diabetes Mellitus is defined as variable degree of intolerance to glucose with either onset or first recognition during pregnancy. Maternal glucose intolerance occurs in 3-10% of pregnancies.

Pregnancy complications like gestational diabetes are reflected grossly and microscopically in the placenta. Placental examination can yield information about the existence and effects of maternal, placental or

fetal disease, the cause of stillbirth, and potential risks in future pregnancies.

The various pathological changes occurring in the placenta of diabetic mothers are considered to be the important risk factors contributing to fetal anoxia and fetal compromise in pregnancy . Previous studies on functional morphology of placentas from diabetic mothers have produced inconsistent results and conclusions.

AIMS AND OBJECTIVES:

To observe & study the various gross morphological changes in the placentas of diabetic mothers and its comparison with normal term placentas.

To observe & study the various histopathological changes that occurs in placentas of diabetic mothers and its comparison with normal term placentas and,

To study the correlation of maternal diabetes with the foetal outcome.

MATERIALS AND METHOD:

Total of 80 specimens, which included 40 placentas of diabetic patients and 40 placentas of non-diabetic (normal) were taken prospectively and were evaluated.

After sample collection all the appropriate measurements were taken including the weight, diameter, circumference, area and thickness of the placenta. Weight

of the baby and maternal history were taken from the case sheets. 2 random bits were taken and processed routinely for paraffin embedding and sections were cut at 5 microns. Hematoxylin and eosin staining of sections were done for histopathological examination of these sections followed by PAS (Periodic Acid Schiff) staining for the demonstration of basement membrane thickening and immunohistochemistry was done to demonstrate the expression of VEGF (Vascular Endothelial Growth Factor) in the trophoblastic cells and the fetal endothelial cells, and the degree of expression is scored at both the sites in both groups. Depending upon the variables we used chi-square test and mann-Whitney U test to analyse the statistical significance. P value of <0.05 was considered statistically significant.

RESULTS AND CONCLUSION:

There is an increased incidence of gestational diabetes in the age group of 20-39 years, with a mean age of 26.5 years.

Multiparous women have been more prone for gestational diabetes mellitus as compared to the primigravida.

The predominant shape of the placentas in the diabetic group is round, with 2 cases of circummarginate placenta while in normal group it is oval with 3 cases showing succenturiate placenta.

The most common site of cord insertion is central in diabetic group while it is moderately eccentric in normal group.

The placentas of diabetic mothers are more heavier and more thicker than the placentas of normal pregnancy.

The values of the diameter, circumference and areas of placentas in both groups did not show much difference.

The newborn of diabetic mothers are heavier than that of normal non-diabetic mothers.

Histopathologically most of the diabetic cases shows an increase in syncytial knots, villous fibrosis, villous edema and fibrinoid necrosis as compared to the normal placenta, with few of the diabetic cases showing features of chorangiosis.

There is an increase in glycogen deposition in placentas of diabetic mothers with basement membrane thickening as demonstrated by PAS staining, with 15% of diabetic cases showing trace staining, 50% showing mild staining, 30% showing moderate staining and 5% cases showing strong staining.

There is reduced expression of VEGF in the fetal endothelial cells and trophoblastic cells in placentas of diabetic mother as compared to the normal placentas.

KEYWORD: angiogenesis, gestational diabetes mellitus, syncytiotrophoblast, vasculogenesis, Vascular Endothelial Growth Factor